



Forest Health Protection
Westside Forest Insect & Disease Service Center
16400 Champion Way, Sandy, OR 97055



August 25, 2014

To Whom it may concern,

On July 2nd, 2014 Holly Kearns and Kristen Chadwick, plant pathologists, and Beth Willhite, entomologist, from the Westside Insect and Disease Service Center with Forest Health Protection, Forest Service visited Camp Arrowhead with Mike Messier and Barry Sims from Trout Mountain Forestry and Mark Hansen from the Girl Scouts. The purpose of our visit was to review the proposed project areas planned for treatment in the winter of 2014/2015. The southern treatment area has extensive laminated root rot caused by the fungal agent *Phellinus sulphurascens*. The area has a history of tree failures and standing dead trees due to this disease as evidenced by numerous root systems pulled out of the ground with decay from laminated root rot. We did not visit the central treatment area since there were no management concerns related to laminated root rot. The Northern proposed treatment area has diffuse laminated root rot. It also has blown down associated with an ice storm that occurred in 2012. Many of the trees that blew down in 2012 in this area showed little evidence of decay from laminated root rot.

Laminated Root Rot Biology

Laminated root rot (LRR) is a natural disturbance agent in northwest conifer forests. It is thought of as a disease of the site, occupying affected forest lands for centuries. It is a primary disturbance agent, driving forest succession in this area. Conifer species have varying levels of susceptibility to laminated root rot. Douglas-fir, some of the true fir species, and mountain hemlock are considered the most susceptible species. Western hemlock only experiences slight damage while western red cedar, ponderosa pine, and western white pine are considered resistant to laminated root rot. Hardwood species are immune to this disease.

Spread of LRR happens in two ways. When roots of adjacent trees contact buried inoculum in old roots or stumps below ground they then can become infected. Buried roots and stumps can remain viable sources of inoculum for decades. Secondary spread is from tree to tree via roots. Spread is generally very slow only moving about a foot a year below ground. LRR is not known to be an aggressive saprophyte and does not colonize root systems after the tree has died, which makes buffer cutting of live uninfected trees a possible management option in some areas to stop the spread.

For susceptible species, maintaining host vigor is not known to prevent infection and decay from LRR. Therefore, management options involving thinning through infected stands are not recommended and if thinned, additional windthrow is expected due to changes in wind dynamics and structurally decayed root systems of the residual stand. Management options maintaining or planting less susceptible species can reduce future impacts to infected stands.

Current Conditions:

For the proposed 2014/2015 thinning areas, LRR is present on both the north and south units. We evaluated the southern treatment unit on our visit. LRR in this area is extensive with substantial decay

found in stumps and on wind thrown trees. The centers of root disease are large in size, and on the area cut in the spring of 2014, cover over six acres and extend into the edge of the proposed northern thinning area. The southern treatment area has evidence of a slowly moving leading edge of a laminated root rot pocket on the east side towards the climbing wall. We were unable to find any evidence of LRR outside the pocket in this area. Management objectives in this area are to stop the spread of the disease in the easterly direction. Within the LRR center, vine maple is present and a few Douglas-fir have seeded back in. There are few other tree species present.

Mike Messier evaluated the northern area more extensively than we did. The area is adjacent to a large laminated root rot pocket that led to an extensive hazard tree removal project in 2014. The laminated root rot in this area tends to fade out in the proposed treatment area and is diffuse in nature. This is evident by the windthrown trees that lack decay from LRR that Mike noticed. The area also has a lot of snags after the 2012 ice storm that led to broken out tops as well as the blown down event.

Management Recommendations:

The large scale nature of laminated root rot throughout this area requires special attention to reduce further damage. Thinning through laminated root rot pockets generally is not recommended since opening up the stand will cause additional windthrow. Instead, where possible, conversion to other species is recommended followed by planting resistant species. The proposed management activities by Trout Mountain Forestry will both add species and structural diversity and are designed to incorporate known locations of LRR into the stand treatment.

For the Southern area, the eastern edge of the laminated root rot pocket is near the climbing wall, and although trees are not currently within striking distance, the management goals are to prevent the spread of LRR towards the east. This is an ideal location to cut a buffer between the edge of the LRR center and the uninfected forest. This can be accomplished by working with fallers to recognize the stain or decay on stumps of trees and remove the next tree until one clean stump is found. For the remainder of the unit, the proposal is to do group selection harvests in the laminated root rot pockets which will create openings to plant less susceptible species in the area. Retention of some of the Douglas-fir in the laminated root rot pocket will provide for future snag and down wood recruitment. The remaining area will be thinned from below to decrease stand density. The treatment in the area will increase stand diversity in both species composition and structure.

For the Northern area, the proposal to lightly thin through the area using a thinning from below and removing the trees damaged by the ice storm will allow for increased tree growth and retention. This combined with group selections around the few known LRR pockets will create openings to add species diversity. The proposal for group selections where laminated root rot is present will help limit the spread of the disease and create openings for planting resistant species. This combined with the species conversion in the adjacent stand that was treated in 2014 will create a nice diverse forest over Camp Arrowhead which is largely dominated by a single age class of Douglas-fir.

Following treatment activities we recommend discouraging Douglas-fir establishment on site for up to 50 years and planting more conifer species that are less susceptible to LRR such as ponderosa pine,

western red cedar, and western white pine. The naturally occurring hardwoods red alder, cottonwood and big leaf maple are immune to laminated root rot and would also be desirable in these openings to add structural and species diversity.

Douglas-fir beetle

Douglas-fir beetle activity on the Westside of the Cascade Mountains is highly correlated with freshly cut or windthrown large-diameter Douglas-fir trees and root disease. Larger outbreaks are almost always associated with major wind or winter storm events. In one year, beetle populations can rapidly increase in Douglas-fir windthrow and large-diameter broken material (their preferred habitat) and then emerge to successfully attack and kill standing green trees. Beetle brood survival is lower in green trees than in down material, so outbreaks triggered by storm events typically subside in three to four years as population numbers decline with each subsequent generation that develops in living trees. Activity in root diseased areas may be exacerbated by storm events or drought.

The following options are recommended for mitigating potential Douglas-fir beetle-caused mortality in residual trees following treatment activities. A conservative approach is suggested due to the prevalence of weakened trees with laminated root rot in the treatment area and the likelihood of continued high Douglas-fir beetle populations in the area during Spring 2015 stemming from the January 2012 ice storm:

- 1) Promptly remove from the site “large” Douglas-fir trees or logs that have been windthrown or cut between the end of October and the first of June. The term “large” is defined as trees 14 inches in diameter at breast height or greater, or logs 14 inches in diameter at the large end or greater. No more than two large trees or four large 16-foot logs per acre should be left on site past the following March.
- 2) If treatment activities occur between the end of October and the first of June, and more than the number recommended in Option 1 of freshly-cut or windthrown trees or logs will remain on site past the following March, apply the Douglas-fir beetle anti-aggregant pheromone MCH to the area where treatment trees or logs will remain, including a buffer area beyond this, by the end of March. I am happy to assist with MCH treatment if this option is selected.

We support the proposal of the Girlscouts for treatment of these areas. It is nice to work with a group that is interested in implementing management activities that take into account the long term nature of laminated root rot and its impacts on management objectives.

Please feel free to contact us if you have further questions via phone or email at klchadwick@fs.fed.us or 503.668.1474 for Kristen, hkearns@fs.fed.us or 503.668.1475 for Holly, or bwhillite@fs.fed.us or 503.668.1477 for Beth.

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